

Appl. No. 10/634,458
Amdt. Dated March 20, 2006
Reply to Office Action of September 19, 2005

REMARKS

Election/Restriction

The Examiner has made a restriction requirement in accordance with 35 U.S.C. §121 between:

Species I: Claims 1-15, drawn to a pressurized system, classified in class 134, subclass 105.

Species II: Claims 16-23, drawn to a pressurized fluid and delivery system, classified in class 134, subclass 94.1.

Species III: Claims 24-26, drawn to a method, classified in class 134, subclass 34.

In response to the Examiner's restriction requirement, election is hereby made WITHOUT TRAVERSE to prosecute the invention of species II, claims 16-23. Claims 1-15, and 24-26 have been cancelled without prejudice.

Claims Rejections - 35 USC §112 Second Paragraph

The Office rejected Claims 16 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. The Applicant has amended the claimed invention to cure this rejection. The applicant respectfully requests that the Office withdraw its rejection of this claim.

Claim Rejections - 35 USC § 103

The Office has quoted the statute from 35 USC 103(a), which is referenced herein. The Office has rejected claim 16-23 as being unpatentable over US Patent No 5,505,539 issued to Lee et al. Applicant has carefully considered the Office rejections and respectfully submits that the amended claims, as supported by the arguments herein, are distinguishable from the cited reference.

Appl. No. 10/634,458
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According to the MPEP §2143.01, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found in either the references themselves or in the knowledge generally available to one of ordinary skill in the art."

A useful presentation for the proper standard for determining obviousness under 35 USC §103(a) can be illustrated as follows:

1. Determining the scope and contents of the prior art;
2. Ascertaining the differences between the prior art and the claims at issue;
3. Resolving the level of ordinary skill in the pertinent art; and
4. Considering objective evidence present in the application indicating obviousness or unobviousness.

The applicant respectfully submits that the '539 reference is not analogous to the claimed invention. In contrast to the claimed invention, the '539 reference is used in the spray application of coatings. Rather than being the primary solvent in a process fluid employed in a supercritical cleaning process, the CO₂ is a solute, used to adjust the viscosity, spray pattern and particulate size of the coating. The coating is sprayed through a nozzle, but is not pressurized once it leaves the nozzle. The CO₂ once it is no longer under pressure rapidly gasifies, the remaining coating is deposited on the item to be coated. This being the case, pressure and temperature are dictated by the solubility of the coating, not the solubility of any residue, photoresist or particles disposed on a workpiece. As solubility is dependant upon temperature and pressure, and even minimal changes in temperature and pressure have substantial effects on the solubility of the supercritical solvents, the pressure and temperature requirements are substantially lower for a solute to carry a coating than for a workpiece processing fluid to dissolve a hardened resin or coating from a workpiece. In principle, the '539 reference acts like an elaborate, environmentally friendly can of spray paint. In contrast, the claimed invention is a preliminary mixing component of a semiconductor wafer processing chamber. Co-additives are mixed with a supercritical solvent to

Appl. No. 10/634,458
Amdt. Dated March 20, 2006
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enhance its solubility with the residues and coatings sought to be removed from the workpiece. Proportionately more supercritical fluid is added and higher pressures and temperatures are indicated than for the '539 reference. The applicant submits that the cited reference would not be deemed analogous by one skilled in the art of semiconductor wafer processing as the '539 reference is used in an entirely different field of endeavor, namely coating or painting materials, rather than in the processing of wafers.

In addition to the cited reference being non-analogous, and therefore an improper reference, the Office correctly acknowledges that cited reference fails to disclose the placement of a directional valve between a process fluid heater, an additive heater, and the process system. This is more particularly apparent as the cited reference, likewise, fails to provide a process system.

The cited reference further fails to provide a pump analogous to that claimed. The cited reference specifically and exclusively describes a Haskel Model No. DSF-25 carbon dioxide feed pump (Col. 9, ll. 41-42, Table 2). The DSF-25 is rated to provide maximum pressures of less than 4,000 psi. The DSF-25 would provide too little pressure to provide and maintain a process fluid at a process pressure. As articulated above, the cited reference is unconcerned about maintaining a process pressure after the fluid is propelled from the nozzle at there is no enclosure, and the pressure of the fluid rapidly decreases to atmospheric pressure.

Referring to claims 17 and 18, in contrast to the claimed invention, the cited reference fails to disclose the use of a mixer disposed between a directional valve and a process system. As noted above, no process system is described, and no directional valve is disclosed. Consequently, no mixer is disposed between the directional valve and the process system. In contrast, in the claimed invention, mixing of the additives and the process fluid occurs downstream at the directional valve and is completed by the static or active mixer before its entry into the process chamber. Similarly, with regard to claim 19, no mixture heater may be disposed between the mixer and the process system raising the temperature of the mixture to a process temperature. Indeed, the cited reference specifically teaches heating the components prior to mixing (Fig 6).

Appl. No. 10/634,458
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The only down stream heater is on the recirculation loop which is engaged when the nozzle is closed. This heater is only used to prevent a phase separation. One skilled in the art will readily appreciate that given the cited reference's highly flammable coatings, the cited reference is reluctant to heat the mixture aggressively.

Furthermore, with regard to claim 21, the cited reference fails to disclose a shunt disposed between the mixer and the process system. While the cited reference discloses a recirculation of the mixed coating fluid when the spray gun is not engaged, the spray gun is not analogous to the claimed process system of the claimed invention as defined by the specification. The spray gun does not perform a supercritical wafer cleaning process. It merely acts to control the flow of the coating, diluted or thinned by the supercritical fluid, from the source.

The applicant, therefore, respectfully submits that the '539 reference cited by the Office, either alone, or in combination with some unidentified reference, fails to disclose or suggest the invention. Indeed, the applicant notes that nowhere in the cited reference is there a suggestion to make the modifications to that which is disclosed in the reference that are allegedly obvious to one skilled in the art. The cited reference is for a relatively low pressure application and notes that small changes in pressure have significant effects on solubility. The cited reference provides no suggestion to use its system in combination with a process system, let alone with a process system for cleaning wafers. The applicant further notes the significantly distinct application of the cited reference and contrasts it with the claimed invention and submits that the cited reference is non-analogous and fails to disclose a fluid delivery system configured according to claims 16-23. The applicant, therefore, requests that the Office withdraw its rejection of claims 16-23.

Telephone Interview

The applicant hereby requests that the Office contact the undersigned attorney to resolve any remaining issues relating to the patentability of the claimed invention. The applicant respectfully submits that such a conversation will benefit but the Office and the public by expeditiously resolving the current case in favor of patentability.

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Applicant believes the above amendments and remarks to be fully responsive to the Office Action, thereby placing this application in condition for allowance. No new matter is added. Applicant requests speedy reconsideration, and further requests that Examiner contact its attorney by telephone, facsimile, or email for quickest resolution, if there are any remaining issues.

Respectfully submitted,



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